recognize various modifications and changes that may be made to the present invention without strictly following the example embodiments and applications illustrated and described herein, and without departing from the true spirit and scope of the present invention, which is set forth in the following claims.

What is claimed is:

1. For use in transforming color between color imaging systems, a color mapping method comprising:

providing forward transformation profiles that characterize the color imaging systems;

using the forward transformation profiles to generate respective sets of device-independent color values for the color imaging systems;

determining color conversions by iteratively reducing differences between the sets of device-independent color values, including performing a first reduction in differences between the device-independent color values for all color channels, wherein the first reduction is multi-dimensional, and performing a second reduction in differences between the device-independent color values for the black channel in addition to the first reduction; and

constructing a color map describing a relationship between the color imaging systems using the color conversions, wherein the forward transformation profiles store spectral data, the method further comprising using the spectral data for reconstructing the profiles automatically.

2. For use in transforming color between color imaging systems, a color mapping method comprising:

providing forward transformation profiles that characterize the color imaging systems;

using the forward transformation profiles to generate respective sets of device-independent color values for the color imaging systems;

deterimining color conversions by iteratively reducing differences between the sets of device-independent color values, including performing a first reduction in differences between the device-independent color values for all color channels, wherein the first reduction is multi-dimensional, and performing a second reduction in differences between the device-independent color values for the black channel in addition to the first reduction; and

constructing a color map describing a relationship between the color imaging systems using the color conversions, wherein the forward transformation profiles store spectral data, the method further comprising using the spectral data to allow for forward compatibility of the profiles in anticipation of change in standards specifications.

3. For use in transforming color between color imaging systems, a method according to claim 2, wherein the step of using the spectral data includes reconstructing the profiles automatically.

4. For use in transforming color between color imaging systems, a color mapping method comprising:

providing forward transformation profiles that characterize the color imaging systems;

using the forward transformation profiles to generate respective sets of device-independent independent color values for the color imaging systems;

determining color conversions by iteratively reducing differences between the sets of device-independent color values, including performing a first reduction in differences between the device-independent color values for all color channels, wherein the first reduction is multi-dimensional, and performing a second reduction in differences between the device-independent color values for the black channel in addition to the first reduction; and

constructing a color map describing a relationship between the color imaging systems using the color conversions, wherein the forward transformation profiles store spectral data, the method further comprising using updated spectral data to allow for subsequently constructed profiles.

5. For use in transforming color between color imaging systems, a method according to claim 4, wherein using the updated spectral data includes reconstructing the profiles automatically.

6. For use in transforming color between color imaging systems, a method according to claim 5, wherein using spectral data includes reconstructing the profiles periodically.

7. For use in transforming color between color imaging systems, a method according to claim 5, wherein reconstructing the profiles periodically is a function of a schedule.

8. For use in transforming color between color imaging systems, a color mapping method comprising:

providing forward transformation profiles that characterize the color imaging systems;

using the forward transformation profiles to generate respective sets of device-independent color values for the color imaging systems;

determining color conversions by iteratively reducing differences between the sets of device-independent color values, including performing a first reduction in differences between the device-independent color values for all color channels, wherein the first reduction is multi-dimensional, and performing a second reduction in differences between the device-independent color values for the black channel in addition to the first reduction;

constructing a color map describing a relationship between the color imaging systems using the color conversions; and

setting the device-independent color values for the non-black color channels to zero during the second difference reduction.

9. The method of claim 8, wherein the color channels include cyan, magenta, yellow, and black.

10. The method of claim 8, wherein the device-independent color values include L*a*b* color values.

11. A method comprising:

obtaining sets of device-independent color values for source and destination imaging devices;

reducing differences between the device-independent color values for all color channels, wherein the reduction of differences for all color channels is a multi-dimensional reduction;

reduction differences between the device-independent color values for the black channel;

generating a color map between the source and destination color imaging devices based on both the difference reduction for the black channel and the difference reduction for all color channels; and

setting the non-black color channels to zero during the reduction of differences for the black channel.

12. The method of claim 11, further comprising keeping the black channel substantially fixed during the reduction of differences for all color channels.

13. The method of claim 11, wherein the color channels include cyan, magenta, yellow and black.

14. The method of claim 11, wherein the color channels include cyan, magenta, yellow, and black, and each of the difference reductions includes a multi-dimensional reduction of differences between the device-independent values for the cyan, magenta, yellow and black channels.

15. The method of claim 11, wherein the multi-dimensional reduction is configured such that each of the destination color channels varies with at least two source color channels.

16. A method comprising:

obtaining sets of device-independent color values for source and destination imaging devices;

reducing differences between the device-independent color values for all color channels, wherein the reduction of differences for all color channels is a multi-dimensional reduction;

reducing differences between the device-independent color values for the black channel;

generating a color map between the source and destination color imaging devices based on both the difference reduction for the black channel and the difference reduction for all color channels,

wherein the color channels include cyan, magenta, yellow, and black, and each of the difference reductions includes a multi-dimensional reduction of differences between the device-independent values for the cyan, magenta, yellow, and black channels, and

wherein:

reducing the differences for the black channel includes reducing the differences for the cyan, magenta, yellow, and black channels while keeping the cyan, magenta, and yellow values set to zero, and

reducing the differences for all color channels includes reducing the differences for the cyan, magenta, yellow, and black channels while keeping the black channel fixed at the levels determined from the reduction of differences for the black channel.

17. The method of claim 11, wherein the device-independent color values include L*a*b* color values.

18. A data storage medium containing a computer-executable program that, when executed:

obtains sets of device-independent color values for source and destination imaging devices;

reduces the differences between the device-independent color values for all color channels, wherein the reduction of differences for all color channels is a multi-dimensional reduction;

reduces differences between the device-independent color values for the black channel;

generates a color map between the source and destination color imaging devices based on both the difference reduction for the black channel and the difference reduction for all channels;

wherein the non-black color channels are set to zero during the reduction of differences for the black channel.

19. The data storage medium of claim 18, wherein the black channel is substantially fixed during the reduction of differences for all color channels.

20. The data storage medium of claim 18, wherein the color channels include cyan, magenta, yellow, and black.

21. The data storage medium of claim 18, wherein the color channels include cyan, magenta, yellow, and black, and each of the difference reductions includes a multi-dimensional reduction of differences between the device-independent values for the cyan, magenta, yellow, and black channels.

22. The data storage medium of claim 18, wherein the multi-dimensional reduction is configured such that each of the destination color channels varies with at least two source color channels.

23. The data storage medium of claim 18, wherein the device-independent color values include L*a*b* color values.

24. A data storage medium containing a computer-executable program that, when executed:

obtains sets of device-independent color values for source and destination imaging devices;

reduces differences between the device-independent color values for all color channels, wherein the reduction of differences for all color channels is multi-dimensional reduction;

reduces differences between the device-independent color values for the black channel;

generates a color map between the source and destination color imaging devices based on both the difference reduction for the black channel and the difference reduction for all color channels,

wherein the color channels include cyan, magenta, yellow, and black, and each of the difference reductions includes a multi-dimensional reduction of differences between the device-independent values for the cyan, magenta, yellow, and black channels, and

wherein:

reducing the differences for the black channel includes reducing the differences for the cyan, magenta, yellow, and black channels while keeping the cyan, magenta, and yellow values set to zero, and

reduction the difference for all color channels includes reducing the differences for the cyan, magenta, yellow, and black channels while keeping the black channel fixed at the levels determined from the reduction of differences for the black channel.

25. A method of mapping of CMYK values between source and destination devices, the method comprising:

(a) generating L*a*b* values for source and destination CMYK values;

(b) iteratively reducing differences between the L*a*b* values by adjusting the destination K values and setting the destination CMY values to zero;

(c) iteratively reducing differences between the L*a*b* values by adjusting the destination CMY values and keeping the K values substantially fixed at the levels determined in step (b); and

(d) generating a color map based on both of the iterative difference reductions of steps (b) and (c).

26. The method of claim 25, further comprising, in the event the differences between the L*a*b* values are not initially reduced to an acceptable degree, iteratively reducing differences between the L*a*b* values by adjusting the destination K values and keeping the destination CMY values determined in step (c) fixed.

27. The method of claim 25, further comprising, in the event the differences between the L*a*b* values are not initially reduced to an acceptable degree:

(e) iteratively reducing differences between the L*a*b* values by adjusting the destination K values and keeping the destination CMY values determined in step (c) fixed;

(f) iteratively reducing differences between the L*a*b* values by adjusting the destination CMY values and keeping the destination K values determined in step (e) fixed; and

(g) repeating steps (e) and (f) on an alternating basis until differences between the L*a*b* values are reduced to the acceptable degree.

28. A data storage medium containing a computer-executable program that, when executed:

(a) generates L*a*b* values for source and destination CMYK values;

(b) iteratively reduces differences between the L*a*b* values by adjusting the destination K values and setting the destination CMY values to zero;

(c) iteratively reduces differences between the L*a*b* values by adjusting the destination CMY values and keeping the K values substantially fixed at the levels determined in step (b); and

(d) generates a color map based on both of the iterative difference reductions of steps (b) and (c).

29. The data storage medium of claim 28, wherein, in the event the differences between the L*a*b* values are not initially reduced to an acceptable degree, the program iteratively reduces differences between the L*a*b* values by adjusting the destination K values and keeping the destination CMY values determined in step (c) fixed.

30. The data storage medium of claim 28 wherein, in the event the differences between the L*a*b* values are not initially reduced to an acceptable degree, the program:

(e) iteratively reduces differences between the L*a*b* values by adjusting the destination K values and keeping the destination CMY values determined in step (c) fixed;

(f) iteratively reduces differences between the L*a*b* values by adjusting the destination CMY values and keeping the destination K values determined in step (e) fixed; and

(g) repeats steps (e) and (f) on an alternating basis until differences between the L*a*b* values are reduced to the acceptable degree.

31. A method for mapping of color values between source and destination devices, the method comprising:

(a) generating device-independent color values for source and destination device-independent values;

(b) iteratively reducing differences between the device-independent color values by adjusting the destination black channel values and setting the destination non-black channel values to zero;

(c) iteratively reducing differences between the device-independent color values by adjusting the destination non-black channel values and keeping the destination black channel values substantially fixed at the levels determined in step (b); and

(d) generating a color map based on both of the iterative difference reductions of steps (b) and (c).

32. The method of claim 31, further comprising, in the event the differences between the device-independent color values are not initially reduced to an acceptable degree, iteratively reducing differences between the device-independent color values by adjusting the destination black channel values and keeping the destination non-black channel values determined in step (c) fixed.

33. The method of claim 31, further comprising, in the event the differences between the device-independent color values are not initially reduced to an acceptable degree;

(e) iteratively reducing differences between the device-independent color values by adjusting the destination black channel values and keeping the destination non-black channel values determined in step (c) fixed;

(f) iteratively reducing differences between the device-independent color values by adjusting the destination non-black channel values and keeping the destination black channel values determined in step (e) fixed; and

(g) repeating steps (e) and (f) on an alternating basis until differences between the device-independent color values are reduced to the acceptable degree.

34. A data storage medium containing a computer-executable program that, when executed:

(a) generates device-independent color values for source and destination device-dependent color values;

(b) iteratively reduces differences between the device-independent color values by adjusting the destination black channel values and setting the destination non-black channel values to zero;

(c) iteratively reduces differences between the device-independent color values by adjusting the destination non-black channel values and keeping the black channel values substantially fixed at the level determined in step (b); and

(d) generates a color map based on both of the iterative difference reductions of steps (b) and (c).

35. The data storage medium of claim 34, wherein, in the event the differences between the device-independent color values are not initially reduced to an acceptable degree, the program iteratively reduces differences between the device-independent color values by adjusting the destination black channel values and keeping the destination non-black channel values determined in step (c) fixed.

36. The data storage medium of claim 34, wherein, in the event the differences between the device-independent color values are not initially reduced to an acceptable degree, the program:

(e) iteratively reduces differences between the device-independent color values by adjusting the destination black channel values and keeping the destination non-black channel values determined in step (c) fixed;

(f) iteratively reduces differences between the device-independent color values by adjusting the destination non-black channel values and keeping the destination black channel values determined in step (e) fixed; and

(g) repeats steps (e) and (f) on an alternating basis until differences between the device-independent color values are reduced to the acceptable degree.

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